Generate Collection | Print

Search Results - Record(s) 1 through 3 of 3 returned.

☐ 1. 6504006 . 12 Oct 01; 07 Jan 03. Substrate peptides and assays for detecting and measuring proteolytic activity of serotype A neurotoxin from clostridium botulinum. Shine; Nancy Rose, et al. 530/323; 435/975 530/327. A61K038/04 C07K016/00 C07K017/00 C07K005/00 G01N033/53.

☐ 2. 6203794 . 01 May 97; 20 Mar 01. Modification of clostridial toxins for use as transport proteins. Dolly; James Oliver, et al. 424/184.1; 424/164.1 424/167.1 424/178.1 424/179.1 424/183.1 424/234.1 424/235.1 424/236.1 424/239.1 424/247.1 424/832 530/300 530/350. A61K039/395 A61K039/02 A61K038/00 C07K014/00.

☐ 3. 5965699 . 06 Nov 96; 12 Oct 99. Assay for the proteolytic activity of serotype a from clostridium botulinum. Schmidt; James J., et al. 530/326; 435/183 435/252.7 435/4 435/7.1 435/7.71 435/7.72 435/842 530/300 530/324 530/325 530/327 530/328 530/329 530/330 530/333 530/335 530/337 530/350 530/839 930/10 930/20. C07K007/00 C12Q001/00 G01N033/52.

Generate Collection | Print

Terms	Documents
5965699	3

Previous Page Next Page

```
ID   SN25_DROME     STANDARD;      PRT;   212 AA.
AC   P36975;
DT   01-JUN-1994 (Rel. 29, Created)
DT   01-JUN-1994 (Rel. 29, Last sequence update)
DT   15-SEP-2003 (Rel. 42, Last annotation update)
DE   Synaptosomal-associated protein 25 (SNAP-25).
GN   SNAP25.
OS   Drosophila melanogaster (Fruit fly).
OC   Eukaryota; Metazoa; Arthropoda; Hexapoda; Insecta; Pterygota;
OC   Neoptera; Endopterygota; Diptera; Brachycera; Muscomorpha;
OC   Ephydroidea; Drosophilidae; Drosophila.
OX   NCBI_TaxID=7227;
RN   [1]
RP   SEQUENCE FROM N.A.
RC   TISSUE=Head;
RX   MEDLINE=94043281; PubMed=8226991;
RA   Risinger C.; Blomqvist A.G., Lundell I., Lambertsson A.,
RA   Nassel D., Pieribone V.A., Brodin L., Larhammar D.;
RT   "Evolutionary conservation of synaptosome-associated protein 25 kDa
RT   (SNAP-25) shown by Drosophila and Torpedo cDNA clones.";
RL   J. Biol. Chem. 268:24408-24414(1993).
RN   [2]
RP   SEQUENCE FROM N.A.
RX   MEDLINE=97417485; PubMed=9272858;
RA   Risinger C., Deitcher D.L., Lundell I., Schwarz T.L., Larhammar D.;
RT   "Complex gene organization of synaptic protein SNAP-25 in Drosophila
RT   melanogaster.";
RL   Gene 194:169-177(1997).
CC   -!- FUNCTION: MAY PLAY AN IMPORTANT ROLE IN THE SYNAPTIC FUNCTION OF
CC       SPECIFIC NEURONAL SYSTEMS. ASSOCIATES WITH PROTEINS INVOLVED IN
CC       VESICLE DOCKING AND MEMBRANE FUSION.
CC   -!- SUBCELLULAR LOCATION: COMPLEXED WITH MACROMOLECULAR ELEMENTS OF
CC       THE NERVE TERMINAL.
CC   -!- TISSUE SPECIFICITY: EXCLUSIVELY FOUND IN BRAIN AND GANGLIA.
CC   -!- SIMILARITY: BELONGS TO THE SNAP-25 FAMILY.
CC   -!- SIMILARITY: CONTAINS 2 T-SNARE COILED-COIL HOMOLOGY DOMAINS.
CC   ---------------------------------------------------------------------
CC   This SWISS-PROT entry is copyright. It is produced through a collaboration
CC   between the Swiss Institute of Bioinformatics and the EMBL outstation -
CC   the European Bioinformatics Institute. There are no restrictions on its
CC   use by non-profit institutions as long as its content is in no way
CC   modified and this statement is not removed. Usage by and for commercial
CC   entities requires a license agreement (See http://www.isb-sib.ch/announce/
CC   or send an email to license@isb-sib.ch).
CC   ---------------------------------------------------------------------
DR   EMBL; L22021; AAA16059.1; -.
DR   EMBL; U81153; AAB39757.1; -.
DR   EMBL; U81147; AAB39757.1; JOINED.
DR   EMBL; U81148; AAB39757.1; JOINED.
DR   EMBL; U81149; AAB39757.1; JOINED.
DR   EMBL; U81150; AAB39757.1; JOINED.
DR   EMBL; U81151; AAB39757.1; JOINED.
DR   EMBL; U81152; AAB39757.1; JOINED.
DR   FlyBase; FBgn0011288; Snap25.
DR   GO; GO:0005886; C:plasma membrane; NAS.
DR   GO; GO:0005486; F:t-SNARE activity; NAS.
DR   GO; GO:0007269; P:neurotransmitter secretion; NAS.
DR   GO; GO:0016081; P:synaptic vesicle docking; NAS.
DR   GO; GO:0016083; P:synaptic vesicle fusion; NAS.
DR   InterPro; IPR000928; SNAP-25.
DR   InterPro; IPR000727; T_SNARE.
DR   Pfam; PF00835; SNAP-25; 1.
DR   SMART; SM00397; t_SNARE; 2.
DR   PROSITE; PS50192; T_SNARE; 2.
KW   Synaptosome; Neurone; Repeat; Coiled coil.
```

```
FT   DOMAIN       26     88       T-SNARE COILED-COIL HOMOLOGY 1.
FT   DOMAIN      148    210       T-SNARE COILED-COIL HOMOLOGY 2.
FT   DOMAIN       91     99       CYS-RICH.
SQ   SEQUENCE   212 AA;  23685 MW;  BDC90649A1AF3AC8 CRC64;
     MPADPSEEVA PQVPKTELEE LQINAQGVAD ESLESTRRML ALCEESKEAG IRTLVALDDQ
     GEQLDRIEEG MDQINADMRE AEKNLSGMEK CCGICVLPCN KSQSFKEDDG TWKGNDDGKV
     VNNQPQRVMD DRNGMMAQAG YIGRITNDAR EDEMEENMGQ VNTMIGNLRN MALDMGSELE
     NQNRQIDRIN RKGESNEARI AVANQRAHQL LK
//
```

```
ID   BXA1_CLOBO     STANDARD;      PRT;  1295 AA.
AC   P10845; P01561; P18639;
DT   01-JUL-1989 (Rel. 11, Created)
DT   01-JUL-1993 (Rel. 26, Last sequence update)
DT   28-FEB-2003 (Rel. 41, Last annotation update)
DE   Botulinum neurotoxin type A precursor (EC 3.4.24.69) (BoNT/A)
DE   (Bontoxilysin A) (BOTOX) [Contains: Botulinum neurotoxin A, light-
DE   chain; Botulinum neurotoxin A, heavy-chain].
GN   BOTA OR BNA OR ATX.
OS   Clostridium botulinum.
OC   Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC   Clostridium.
OX   NCBI_TaxID=1491;
RN   [1]
RP   SEQUENCE FROM N.A.
RC   STRAIN=NCTC 2916;
RX   MEDLINE=90235864; PubMed=2185020;
RA   Thompson D.E., Brehm J.K., Oultram J.D., Swinfield T.-J.,
RA   Shone C.C., Atkinson T., Melling J., Minton N.P.;
RT   "The complete amino acid sequence of the Clostridium botulinum type A
RT   neurotoxin, deduced by nucleotide sequence analysis of the encoding
RT   gene.";
RL   Eur. J. Biochem. 189:73-81(1990).
RN   [2]
RP   SEQUENCE FROM N.A.
RC   STRAIN=62A;
RX   MEDLINE=90264400; PubMed=2160960;
RA   Binz B., Kuarzono H., Wille M., Frevent J., Wernars K., Niemann H.;
RT   "The complete sequence of botulinum neurotoxin type A and comparison
RT   with other clostridial neurotoxins.";
RL   J. Biol. Chem. 265:9153-9158(1990).
RN   [3]
RP   SEQUENCE OF 1-65 FROM N.A.
RC   STRAIN=62A;
RX   MEDLINE=97016817; PubMed=8863443;
RA   East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT   "Organization and phylogenetic interrelationships of genes encoding
RT   components of the botulinum toxin complex in proteolytic Clostridium
RT   botulinum types A, B, and F: evidence of chimeric sequences in the
RT   gene encoding the nontoxic nonhemagglutinin component.";
RL   Int. J. Syst. Bacteriol. 46:1105-1112(1996).
RN   [4]
RP   SEQUENCE OF 1-34 FROM N.A.
RC   STRAIN=Hall;
RX   MEDLINE=89350959; PubMed=2669749;
RA   Betley M.J., Somers E., Dasgupta B.R.;
RT   "Characterization of botulinum type A neurotoxin gene: delineation of
RT   the N-terminal encoding region.";
RL   Biochem. Biophys. Res. Commun. 162:1388-1395(1989).
RN   [5]
RP   SEQUENCE OF 1-18 FROM N.A.
RC   STRAIN=Type A NIH;
RX   MEDLINE=96096783; PubMed=8521962;
RA   Fujita R., Fujinaga Y., Inoue K., Nakajima H., Kumon H., Oguma K.;
RT   "Molecular characterization of two forms of nontoxic-nonhemagglutinin
RT   components of Clostridium botulinum type A progenitor toxins.";
RL   FEBS Lett. 376:41-44(1995).
RN   [6]
RP   SEQUENCE OF 1-16.
RX   MEDLINE=84178501; PubMed=6370252;
RA   Schmidt J.J., Sartymoorthy V., Dasgupta B.R.;
RT   "Partial amino acid sequence of the heavy and light chains of
RT   botulinum neurotoxin type A.";
RL   Biochem. Biophys. Res. Commun. 119:900-904(1984).
RN   [7]
```

```
RP   SEQUENCE OF 1-46.
RA   Dasgupta B.R., Foley J., Niece R.;
RT   "Partial sequence of the light chain of botulinum neurotoxin type A.";
RL   Biochemistry 26:4162-4162(1987).
RN   [8]
RP   SEQUENCE OF 1-5 AND 444-456.
RX   MEDLINE=91120847; PubMed=2126206;
RA   Dasgupta B.R., Dekleva M.L.;
RT   "Botulinum neurotoxin type A: sequence of amino acids at the
RT   N-terminus and around the nicking site.";
RL   Biochimie 72:661-664(1990).
RN   [9]
RP   SEQUENCE OF 448-464 AND 872-895.
RX   MEDLINE=89024662; PubMed=3178218;
RA   Sathymoorthy V., Dasgupta B.R., Foley J., Niece R.L.;
RT   "Botulinum neurotoxin type A: cleavage of the heavy chain into two
RT   halves and their partial sequences.";
RL   Arch. Biochem. Biophys. 266:142-151(1988).
RN   [10]
RP   SEQUENCE OF 448-482.
RX   MEDLINE=85285016; PubMed=3896784;
RA   Shone C.C., Hambleton P., Melling J.;
RT   "Inactivation of Clostridium botulinum type A neurotoxin by trypsin
RT   and purification of two tryptic fragments. Proteolytic action near
RT   the COOH-terminus of the heavy subunit destroys toxin-binding
RT   activity.";
RL   Eur. J. Biochem. 151:75-82(1985).
RN   [11]
RP   IDENTIFICATION OF SUBSTRATE.
RX   MEDLINE=94063091; PubMed=8243676;
RA   Schiavo G., Santtuci A., Dasgupta B.R., Mehta P.P., Jontes J.,
RA   Benfenati F., Wilson M.C., Montecucco C.;
RT   "Botulinum neurotoxins serotypes A and E cleave SNAP-25 at distinct
RT   COOH-terminal peptide bonds.";
RL   FEBS Lett. 335:99-103(1993).
RN   [12]
RP   IDENTIFICATION OF SUBSTRATE.
RX   MEDLINE=94124495; PubMed=8294407;
RA   Binz T., Blasi J., Yamasaki S., Baumeister A., Link E., Suedhof T.C.,
RA   Jahn R., Niemann H.;
RT   "Proteolysis of SNAP-25 by types E and A botulinal neurotoxins.";
RL   J. Biol. Chem. 269:1617-1620(1994).
RN   [13]
RP   MUTAGENESIS OF GLU-261; PHE-265 AND TYR-365.
RX   MEDLINE=21556941; PubMed=11700044;
RA   Rigoni M., Caccin P., Johnson E.A., Montecucco C., Rossetto O.;
RT   "Site-directed mutagenesis identifies active-site residues of the
RT   light chain of botulinum neurotoxin type a.";
RL   Biochem. Biophys. Res. Commun. 288:1231-1237(2001).
RN   [14]
RP   X-RAY CRYSTALLOGRAPHY (3.3 ANGSTROMS).
RX   MEDLINE=98455071; PubMed=9783750;
RA   Lacy D.B., Tepp W., Cohen A.C., Dasgupta B.R., Stevens R.C.;
RT   "Crystal structure of botulinum neurotoxin type A and implications
RT   for toxicity.";
RL   Nat. Struct. Biol. 5:898-902(1998).
CC   -!- FUNCTION: INHIBITS ACETYLCHOLINE RELEASE. THE BOTULINUM TOXIN
CC       BINDS WITH HIGH AFFINITY TO PERIPHERAL NEURONAL PRESYNAPTIC
CC       MEMBRANE, IS THEN INTERNALIZED BY RECEPTOR-MEDIATED ENDOCYTOSIS.
CC       THE C-TERMINUS OF THE HEAVY CHAIN (H) IS RESPONSIBLE FOR THE
CC       ADHERENCE OF THE TOXIN TO THE CELL SURFACE WHILE THE N-TERMINUS
CC       MEDIATES TRANSPORT OF THE LIGHT CHAIN FROM THE ENDOCYTIC VESICLE
CC       TO THE CYTOSOL. AFTER TRANSLOCATION, THE LIGHT CHAIN (L)
CC       HYDROLYZES THE 197-GLN-|-ARG-198 BOND IN SNAP-25, THEREBY BLOCKING
CC       NEUROTRANSMITTER RELEASE. INHIBITION OF ACETYLCHOLINE RELEASE
```

```
CC       RESULTS IN FLACCID PARALYSIS, WITH FREQUENT HEART OR RESPIRATORY
CC       FAILURE.
CC   -!- CATALYTIC ACTIVITY: LIMITED HYDROLYSIS OF PROTEINS OF THE
CC       NEUROEXOCYTOSIS APPARATUS, SYNAPTOBREVINS, SNAP25 OR SYNTAXIN. NO
CC       DETECTED ACTION ON SMALL MOLECULE SUBSTRATES.
CC   -!- COFACTOR: BINDS 1 ZINC ION PER SUBUNIT.
CC   -!- SUBUNIT: DISULFIDE-LINKED HETERODIMER OF A LIGHT CHAIN (L) AND A
CC       HEAVY CHAIN (H).
CC   -!- SUBCELLULAR LOCATION: SECRETED.
CC   -!- PHARMACEUTICAL: AVAILABLE UNDER THE NAME BOTOX (ALLERGAN) FOR
CC       THE TREATMENT OF STRABISMUS AND BLEPHAROSPASM ASSOCIATED WITH
CC       DYSTONIA AND CERVICAL DYSTONIA. ALSO USED FOR THE TREATMENT OF
CC       HEMIFACIAL SPASM AND A NUMBER OF OTHER NEUROLOGICAL DISORDERS
CC       CHARACTERIZED BY ABNORMAL MUSCLE CONTRACTION.
CC   -!- MISCELLANEOUS: THERE ARE SEVEN ANTIGENICALLY DISTINCT FORMS OF
CC       BOTULINUM NEUROTOXIN: TYPES A, B, C1, D, E, F, AND G.
CC   -!- SIMILARITY: BELONGS TO PEPTIDASE FAMILY M27.
CC   -!- DATABASE: NAME=BOTOX product information Web site;
CC       WWW="http://www.botox.com/index.jsp?hp&productinfo".
CC   -!- DATABASE: NAME=Protein Spotlight;
CC       NOTE=Issue 19 of February 2002;
CC       WWW="http://www.expasy.org/spotlight/articles/sptlt019.html".
CC   ---------------------------------------------------------------------
CC   This SWISS-PROT entry is copyright. It is produced through a collaboration
CC   between the Swiss Institute of Bioinformatics and the EMBL outstation -
CC   the European Bioinformatics Institute. There are no restrictions on its
CC   use by non-profit institutions as long as its content is in no way
CC   modified and this statement is not removed. Usage by and for commercial
CC   entities requires a license agreement (See http://www.isb-sib.ch/announce/
CC   or send an email to license@isb-sib.ch).
CC   ---------------------------------------------------------------------
DR   EMBL; X52066; CAA36289.1; -.
DR   EMBL; M30196; AAA23262.1; -.
DR   EMBL; X92973; CAA63551.1; -.
DR   EMBL; D67030; BAA11051.1; -.
DR   EMBL; M27892; AAA23269.1; -.
DR   PIR; A35294; BTCLAB.
DR   PIR; S09492; S09492.
DR   PDB; 3BTA; 01-OCT-99.
DR   MEROPS; M27.002; -.
DR   InterPro; IPR000395; Bontoxilysin.
DR   InterPro; IPR006025; Zn_MTpeptdse.
DR   Pfam; PF01742; Peptidase_M27; 1.
DR   ProDom; PD001963; Bontoxilysin; 1.
DR   PROSITE; PS00142; ZINC_PROTEASE; 1.
KW   Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc;
KW   Pharmaceutical; 3D-structure.
FT   INIT_MET        0      0
FT   CHAIN           1    447       BOTULINUM NEUROTOXIN A, LIGHT-CHAIN.
FT   CHAIN         448   1295       BOTULINUM NEUROTOXIN A, HEAVY-CHAIN.
FT   METAL         222    222       ZINC (CATALYTIC).
FT   ACT_SITE      223    223
FT   METAL         226    226       ZINC (CATALYTIC).
FT   METAL         261    261       ZINC (CATALYTIC).
FT   DISULFID      429    453       INTERCHAIN.
FT   DISULFID     1234   1279
FT   TRANSMEM      626    646       POTENTIAL.
FT   TRANSMEM      655    675       POTENTIAL.
FT   VARIANT        26     26       V -> A.
FT   MUTAGEN       261    261       E->A: DRASTIC DECREASE IN ENZYMATIC
FT                                  ACTIVITY.
FT   MUTAGEN       265    265       F->A: DECREASE IN ENZYMATIC ACTIVITY.
FT   MUTAGEN       365    365       Y->A: DECREASE IN ENZYMATIC ACTIVITY.
FT   CONFLICT        1      1       P -> Q (IN REF. 1).
FT   CONFLICT      479    479       E -> P (IN REF. 9).
```

```
FT   CONFLICT    875    875       T -> L (IN REF. 8).
FT   CONFLICT    891    891       S -> K (IN REF. 8).
SQ   SEQUENCE   1295 AA;  149322 MW;  858342F754862579 CRC64;
     PFVNKQFNYK DPVNGVDIAY IKIPNVGQMQ PVKAFKIHNK IWVIPERDTF TNPEEGDLNP
     PPEAKQVPVS YYDSTYLSTD NEKDNYLKGV TKLFERIYST DLGRMLLTSI VRGIPFWGGS
     TIDTELKVID TNCINVIQPD GSYRSEELNL VIIGPSADII QFECKSFGHE VLNLTRNGYG
     STQYIRFSPD FTFGFEESLE VDTNPLLGAG KFATDPAVTL AHELIHAGHR LYGIAINPNR
     VFKVNTNAYY EMSGLEVSFE ELRTFGGHDA KFIDSLQENE FRLYYYNKFK DIASTLNKAK
     SIVGTTASLQ YMKNVFKEKY LLSEDTSGKF SVDKLKFDKL YKMLTEIYTE DNFVKFFKVL
     NRKTYLNFDK AVFKINIVPK VNYTIYDGFN LRNTNLAANF NGQNTEINNM NFTKLKNFTG
     LFEFYKLLCV RGIITSKTKS LDKGYNKALN DLCIKVNNWD LFFSPSEDNF TNDLNKGEEI
     TSDTNIEAAE ENISLDLIQQ YYLTFNFDNE PENISIENLS SDIIGQLELM PNIERFPNGK
     KYELDKYTMF HYLRAQEFEH GKSRIALTNS VNEALLNPSR VYTFFSSDYV KKVNKATEAA
     MFLGWVEQLV YDFTDETSEV STTDKIADIT IIIPYIGPAL NIGNMLYKDD FVGALIFSGA
     VILLEFIPEI AIPVLGTFAL VSYIANKVLT VQTIDNALSK RNEKWDEVYK YIVTNWLAKV
     NTQIDLIRKK MKEALENQAE ATKAIINYQY NQYTEEEKNN INFNIDDLSS KLNESINKAM
     ININKFLNQC SVSYLMNSMI PYGVKRLEDF DASLKDALLK YIYDNRGTLI GQVDRLKDKV
     NNTLSTDIPF QLSKYVDNQR LLSTFTEYIK NIINTSILNL RYESNHLIDL SRYASKINIG
     SKVNFDPIDK NQIQLFNLES SKIEVILKNA IVYNSMYENF STSFWIRIPK YFNSISLNNE
     YTIINCMENN SGWKVSLNYG EIIWTLQDTQ EIKQRVVFKY SQMINISDYI NRWIFVTITN
     NRLNNSKIYI NGRLIDQKPI SNLGNIHASN NIMFKLDGCR DTHRYIWIKY FNLFDKELNE
     KEIKDLYDNQ SNSGILKDFW GDYLQYDKPY YMLNLYDPNK YVDVNNVGIR GYMYLKGPRG
     SVMTTNIYLN SSLYRGTKFI IKKYASGNKD NIVRNNDRVY INVVVKNKEY RLATNASQAG
     VEKILSALEI PDVGNLSQVV VMKSKNDQGI TNKCKMNLQD NNGNDIGFIG FHQFNNIAKL
     VASNWYNRQI ERSSRTLGCS WEFIPVDDGW GERPL
//
```

```
ID   BXA2_CLOBO     STANDARD;      PRT;  1295 AA.
AC   Q45894; P77780;
DT   28-FEB-2003 (Rel. 41, Created)
DT   28-FEB-2003 (Rel. 41, Last sequence update)
DT   28-FEB-2003 (Rel. 41, Last annotation update)
DE   Botulinum neurotoxin type A precursor (EC 3.4.24.69) (BoNT/A)
DE   (Bontoxilysin A) (BOTOX) [Contains: Botulinum neurotoxin A, light-
DE   chain; Botulinum neurotoxin A, heavy-chain].
GN   BOTA OR BNA OR ATX.
OS   Clostridium botulinum.
OC   Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC   Clostridium.
OX   NCBI_TaxID=1491;
RN   [1]
RP   SEQUENCE FROM N.A.
RC   STRAIN=Kyoto-F;
RX   MEDLINE=94143603; PubMed=8310180;
RA   Willems A., East A.K., Lawson P.A., Collins M.D.;
RT   "Sequence of the gene coding for the neurotoxin of Clostridium
RT   botulinum type A associated with infant botulism: comparison with
RT   other clostridial neurotoxins.";
RL   Res. Microbiol. 144:547-556(1993).
RN   [2]
RP   SEQUENCE OF 1-65 FROM N.A.
RC   STRAIN=Kyoto-F;
RX   MEDLINE=97016817; PubMed=8863443;
RA   East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT   "Organization and phylogenetic interrelationships of genes encoding
RT   components of the botulinum toxin complex in proteolytic Clostridium
RT   botulinum types A, B, and F: evidence of chimeric sequences in the
RT   gene encoding the nontoxic nonhemagglutinin component.";
RL   Int. J. Syst. Bacteriol. 46:1105-1112(1996).
CC   -!- FUNCTION: INHIBITS ACETYLCHOLINE RELEASE. THE BOTULINUM TOXIN
CC       BINDS WITH HIGH AFFINITY TO PERIPHERAL NEURONAL PRESYNAPTIC
CC       MEMBRANE, IS THEN INTERNALIZED BY RECEPTOR-MEDIATED ENDOCYTOSIS.
CC       THE C-TERMINUS OF THE HEAVY CHAIN (H) IS RESPONSIBLE FOR THE
CC       ADHERENCE OF THE TOXIN TO THE CELL SURFACE WHILE THE N-TERMINUS
CC       MEDIATES TRANSPORT OF THE LIGHT CHAIN FROM THE ENDOCYTIC VESICLE
CC       TO THE CYTOSOL. AFTER TRANSLOCATION, THE LIGHT CHAIN (L)
CC       HYDROLYZES THE 197-GLN-|-ARG-198 BOND IN SNAP-25, THEREBY BLOCKING
CC       NEUROTRANSMITTER RELEASE. INHIBITION OF ACETYLCHOLINE RELEASE
CC       RESULTS IN FLACCID PARALYSIS, WITH FREQUENT HEART OR RESPIRATORY
CC       FAILURE (BY SIMILARITY).
CC   -!- CATALYTIC ACTIVITY: LIMITED HYDROLYSIS OF PROTEINS OF THE
CC       NEUROEXOCYTOSIS APPARATUS, SYNAPTOBREVINS, SNAP25 OR SYNTAXIN. NO
CC       DETECTED ACTION ON SMALL MOLECULE SUBSTRATES.
CC   -!- SUBUNIT: DISULFIDE-LINKED HETERODIMER OF A LIGHT CHAIN (L) AND A
CC       HEAVY CHAIN (H) (BY SIMILARITY).
CC   -!- SUBCELLULAR LOCATION: SECRETED.
CC   -!- MISCELLANEOUS: THERE ARE SEVEN ANTIGENICALLY DISTINCT FORMS OF
CC       BOTULINUM NEUROTOXIN: TYPES A, B, C1, D, E, F, AND G.
CC   -!- SIMILARITY: BELONGS TO PEPTIDASE FAMILY M27.
CC   ---------------------------------------------------------------------
CC   This SWISS-PROT entry is copyright. It is produced through a collaboration
CC   between the Swiss Institute of Bioinformatics and the EMBL outstation -
CC   the European Bioinformatics Institute. There are no restrictions on its
CC   use by non-profit institutions as long as its content is in no way
CC   modified and this statement is not removed. Usage by and for commercial
CC   entities requires a license agreement (See http://www.isb-sib.ch/announce/
CC   or send an email to license@isb-sib.ch).
CC   ---------------------------------------------------------------------
DR   EMBL; X73423; CAA51824.1; -.
DR   EMBL; X87974; CAA61234.1; -.
DR   HSSP; P10845; 3BTA.
DR   MEROPS; M27.002; -.
```

```
DR   InterPro; IPR000395; Bontoxilysin.
DR   InterPro; IPR006025; Zn_MTpeptdse.
DR   Pfam; PF01742; Peptidase_M27; 1.
DR   ProDom; PD001963; Bontoxilysin; 1.
DR   PROSITE; PS00142; ZINC_PROTEASE; FALSE_NEG.
KW   Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
FT   INIT_MET      0      0       BY SIMILARITY.
FT   CHAIN         1    447       BOTULINUM NEUROTOXIN A, LIGHT-CHAIN.
FT   CHAIN       448   1295       BOTULINUM NEUROTOXIN A, HEAVY-CHAIN.
FT   METAL       222    222       ZINC (CATALYTIC) (BY SIMILARITY).
FT   ACT_SITE    223    223       BY SIMILARITY.
FT   METAL       226    226       ZINC (CATALYTIC) (BY SIMILARITY).
FT   DISULFID    429    453       INTERCHAIN (BY SIMILARITY).
FT   DISULFID   1234   1279       BY SIMILARITY.
FT   TRANSMEM    626    646       POTENTIAL.
FT   TRANSMEM    655    675       POTENTIAL.
SQ   SEQUENCE   1295 AA;  149279 MW;  5DA04A13D98D6372 CRC64;
     PFVNKQFNYK DPVNGVDIAY IKIPNAGQMQ PVKAFKIHNK IWVIPERDTF TNPEEGDLNP
     PPEAKQVPVS YYDSTYLSTD NEKDNYLKGV TKLFERIYST DLGRMLLTSI VRGIPFWGGS
     TIDTELKVID TNCINVIQPD GSYRSEELNL VIIGPSADII QFECKSFGHD VLNLTRNGYG
     STQYIRFSPD FTFGFEESLE VDTNPLLGAG KFATDPAVTL AHELIHAEHR LYGIAINPNR
     VFKVNTNAYY EMSGLEVSFE ELRTFGGHDA KFIDSLQENE FRLYYYNKFK DVASTLNKAK
     SIIGTTASLQ YMKNVFKEKY LLSEDTSGKF SVDKLKFDKL YKMLTEIYTE DNFVNFFKVI
     NRKTYLNFDK AVFRINIVPD ENYTIKDGFN LKGANLSTNF NGQNTEINSR NFTRLKNFTG
     LFEFYKLLCV RGIIPFKTKS LDEGYNKALN DLCIKVNNWD LFFSPSEDNF TNDLDKVEEI
     TADTNIEAAE ENISLDLIQQ YYLTFDFDNE PENISIENLS SDIIGQLEPM PNIERFPNGK
     KYELDKYTMF HYLRAQEFEH GDSRIILTNS AEEALLKPNV AYTFFSSKYV KKINKAVEAF
     MFLNWAEELV YDFTDETNEV TTMDKIADIT IIVPYIGPAL NIGNMLSKGE FVEAIIFTGV
     VAMLEFIPEY ALPVFGTFAI VSYIANKVLT VQTINNALSK RNEKWDEVYK YTVTNWLAKV
     NTQIDLIREK MKKALENQAE ATKAIINYQY NQYTEEEKNN INFNIDDLSS KLNESINSAM
     ININKFLDQC SVSYLMNSMI PYAVKRLKDF DASVRDVLLK YIYDNRGTLV LQVDRLKDEV
     NNTLSADIPF QLSKYVDNKK LLSTFTEYIK NIVNTSILSI VYKKDDLIDL SRYGAKINIG
     DRVYYDSIDK NQIKLINLES STIEVILKNA IVYNSMYENF STSFWIKIPK YFSKINLNNE
     YTIINCIENN SGWKVSLNYG EIIWTLQDNK QNIQRVVFKY SQMVNISDYI NRWIFVTITN
     NRLTKSKIYI NGRLIDQKPI SNLGNIHASN KIMFKLDGCR DPRRYIMIKY FNLFDKELNE
     KEIKDLYDSQ SNSGILKDFW GNYLQYDKPY YMLNLFDPNK YVDVNNIGIR GYMYLKGPRG
     SVVTTNIYLN STLYEGTKFI IKKYASGNED NIVRNNDRVY INVVVKNKEY RLATNASQAG
     VEKILSALEI PDVGNLSQVV VMKSKDDQGI RNKCKMNLQD NNGNDIGFIG FHLYDNIAKL
     VASNWYNRQV GKASRTFGCS WEFIPVDDGW GESSL
//
```

```
ID   BXE_CLOBO      STANDARD;      PRT;  1250 AA.
AC   Q00496;
DT   01-JUL-1993 (Rel. 26, Created)
DT   01-JUL-1993 (Rel. 26, Last sequence update)
DT   28-FEB-2003 (Rel. 41, Last annotation update)
DE   Botulinum neurotoxin type E precursor (EC 3.4.24.69) (BoNT/E)
DE   (Bontoxilysin E).
OS   Clostridium botulinum.
OC   Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC   Clostridium.
OX   NCBI_TaxID=1491;
RN   [1]
RP   SEQUENCE FROM N.A.
RC   STRAIN=Beluga;
RX   MEDLINE=92181428; PubMed=1543481;
RA   Poulet S., Hauser D., Quanz M., Niemann H., Popoff M.R.;
RT   "Sequences of the botulinal neurotoxin E derived from Clostridium
RT   botulinum type E (strain Beluga) and Clostridium butyricum (strains
RT   ATCC 43181 and ATCC 43755).";
RL   Biochem. Biophys. Res. Commun. 183:107-113(1992).
RN   [2]
RP   SEQUENCE FROM N.A.
RX   MEDLINE=92174922; PubMed=1541280;
RA   Whelan S.M., Elmore M.J., Bodsworth N.J., Atkinson T., Minton N.P.;
RT   "The complete amino acid sequence of the Clostridium botulinum type-E
RT   neurotoxin, derived by nucleotide-sequence analysis of the encoding
RT   gene.";
RL   Eur. J. Biochem. 204:657-667(1992).
RN   [3]
RP   SEQUENCE OF 1-251 FROM N.A.
RX   MEDLINE=90264400; PubMed=2160960;
RA   Binz T., Kurazono H., Wille M., Frevert J., Wernars K., Niemann H.;
RT   "The complete sequence of botulinum neurotoxin type A and comparison
RT   with other clostridial neurotoxins.";
RL   J. Biol. Chem. 265:9153-9158(1990).
RN   [4]
RP   SEQUENCE OF 1-13.
RX   MEDLINE=85197963; PubMed=3888113;
RA   Schmidt J.J., Sathyamoorthy V., Dasgupta B.R.;
RT   "Partial amino acid sequences of botulinum neurotoxins types B and
RT   E.";
RL   Arch. Biochem. Biophys. 238:544-548(1985).
RN   [5]
RP   SEQUENCE OF 419-426.
RX   MEDLINE=90344918; PubMed=2116911;
RA   Gimenez J.A., Dasgupta B.R.;
RT   "Botulinum neurotoxin type E fragmented with endoproteinase Lys-C
RT   reveals the site trypsin nicks and homology with tetanus
RT   neurotoxin.";
RL   Biochimie 72:213-217(1990).
RN   [6]
RP   IDENTIFICATION OF SUBSTRATE.
RX   MEDLINE=94063091; PubMed=8243676;
RA   Schiavo G., Santtuci A., Dasgupta B.R., Mehta P.P., Jontes J.,
RA   Benfenati F., Wilson M.C., Montecucco C.;
RT   "Botulinum neurotoxins serotypes A and E cleave SNAP-25 at distinct
RT   COOH-terminal peptide bonds.";
RL   FEBS Lett. 335:99-103(1993).
RN   [7]
RP   IDENTIFICATION OF SUBSTRATE.
RX   MEDLINE=94124495; PubMed=8294407;
RA   Binz T., Blasi J., Yamasaki S., Baumeister A., Link E., Suedhof T.C.,
RA   Jahn R., Niemann H.;
RT   "Proteolysis of SNAP-25 by types E and A botulinal neurotoxins.";
RL   J. Biol. Chem. 269:1617-1620(1994).
```

```
CC   -!- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
CC       RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
CC       AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
CC       WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
CC       INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
CC       ENDOPEPTIDASE THAT CATALYZES THE HYDROLYSIS OF THE 180-ARG-|-ILE-
CC       181 BOND IN SNAP-25.
CC   -!- CATALYTIC ACTIVITY: LIMITED HYDROLYSIS OF PROTEINS OF THE
CC       NEUROEXOCYTOSIS APPARATUS, SYNAPTOBREVINS, SNAP25 OR SYNTAXIN. NO
CC       DETECTED ACTION ON SMALL MOLECULE SUBSTRATES.
CC   -!- COFACTOR: BINDS 1 ZINC ION PER SUBUNIT (BY SIMILARITY).
CC   -!- SUBUNIT: DISULFIDE-LINKED HETERODIMER OF A LIGHT CHAIN (L) AND A
CC       HEAVY CHAIN (H). THE LIGHT CHAIN HAS THE PHARMACOLOGICAL ACTIVITY,
CC       WHILE THE N-AND C-TERMINAL OF THE HEAVY CHAIN MEDIATE CHANNEL
CC       FORMATION AND TOXIN BINDING, RESPECTIVELY.
CC   -!- SUBCELLULAR LOCATION: SECRETED.
CC   -!- MISCELLANEOUS: THERE ARE SEVEN ANTIGENICALLY DISTINCT FORMS OF
CC       BOTULINUM NEUROTOXIN: TYPES A, B, C1, D, E, F, AND G.
CC   -!- SIMILARITY: BELONGS TO PEPTIDASE FAMILY M27.
CC   ----------------------------------------------------------------------
CC   This SWISS-PROT entry is copyright. It is produced through a collaboration
CC   between the Swiss Institute of Bioinformatics and the EMBL outstation -
CC   the European Bioinformatics Institute. There are no restrictions on its
CC   use by non-profit institutions as long as its content is in no way
CC   modified and this statement is not removed. Usage by and for commercial
CC   entities requires a license agreement (See http://www.isb-sib.ch/announce/
CC   or send an email to license@isb-sib.ch).
CC   ----------------------------------------------------------------------
DR   EMBL; X62089; CAA43999.1; -.
DR   EMBL; X62683; CAA44558.1; -.
DR   PIR; A60027; A60027.
DR   PIR; B35294; B35294.
DR   PIR; JH0257; JH0257.
DR   PIR; S08575; S08575.
DR   PIR; S18111; S18111.
DR   PIR; S21178; S21178.
DR   HSSP; P10845; 3BTA.
DR   MEROPS; M27.002; -.
DR   InterPro; IPR000395; Bontoxilysin.
DR   InterPro; IPR006025; Zn_MTpeptdse.
DR   Pfam; PF01742; Peptidase_M27; 1.
DR   PRINTS; PR00760; BONTOXILYSIN.
DR   ProDom; PD001963; Bontoxilysin; 1.
DR   PROSITE; PS00142; ZINC_PROTEASE; 1.
KW   Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
FT   INIT_MET      0      0
FT   CHAIN         1    421       BOTULINUM NEUROTOXIN E, LIGHT-CHAIN.
FT   CHAIN       422   1250       BOTULINUM NEUROTOXIN E, HEAVY-CHAIN.
FT   METAL       211    211       ZINC (CATALYTIC) (BY SIMILARITY).
FT   ACT_SITE    212    212       BY SIMILARITY.
FT   METAL       215    215       ZINC (CATALYTIC) (BY SIMILARITY).
FT   DISULFID    411    425       INTERCHAIN (PROBABLE).
FT   CONFLICT    176    176       R -> G (IN REF. 2).
FT   CONFLICT    197    197       C -> S (IN REF. 2 AND 3).
FT   CONFLICT    339    339       R -> A (IN REF. 2).
FT   CONFLICT    772    772       I -> L (IN REF. 2).
FT   CONFLICT    962    963       FE -> LQ (IN REF. 2).
FT   CONFLICT    966    966       R -> A (IN REF. 2).
FT   CONFLICT   1194   1194       N -> NN (IN REF. 2).
SQ   SEQUENCE   1250 AA;  143712 MW;  D9FCE26DDA041EB4 CRC64;
     PKINSENYND PVNDRTILYI KPGGCQEFYK SFNIMKNIWI IPERNVIGTT PQDFHPPTSL
     KNGDSSYYDP NYLQSDEEKD RFLKIVTKIF NRINNNLSGG ILLEELSKAN PYLGNDNTPD
     NQFHIGDASA VEIKFSNGSQ DILLPNVIIM GAEPDLFETN SSNISLRNNY MPSNHRFGSI
     AIVTFSPEYS FRFNDNCMNE FIQDPALTLM HELIHSLHGL YGAKGITTKY TITQKQNPLI
     TNIRGTNIEE FLTFGGTDLN IITSAQSNDI YTNLLADYKK IASKLSKVQV SNPLLNPYKD
```

```
     VFEAKYGLDK DASGIYSVNI NKFNDIFKKL YSFTEFDLRT KFQVKCRQTY IGQYKYFKLS
     NLLNDSIYNI SEGYNINNLK VNFRGQNANL NPRIITPITG RGLVKKIIRF CKNIVSVKGI
     RKSICIEINN GELFFVASEN SYNDDNINTP KEIDDTVTSN NNYENDLDQV ILNFNSESAP
     GLSDEKLNLT IQNDAYIPKY DSNGTSDIEQ HDVNELNVFF YLDAQKVPEG ENNVNLTSSI
     DTALLEQPKI YTFFSSEFIN NVNKPVQAAL FVSWIQQVLV DFTTEANQKS TVDKIADISI
     VVPYIGLALN IGNEAQKGNF KDALELLGAG ILLEFEPELL IPTILVFTIK SFLGSSDNKN
     KVIKAINNAL KERDEKWKEV YSFIVSNWMT KINTQFNKRK EQMYQALQNQ VNAIKTIIES
     KYNSYTLEEK NELTNKYDIK QIENELNQKV SIAMNNIDRF LTESSISYLM KIINEVKINK
     LREYDENVKT YLLNYIIQHG SILGESQQEL NSMVTDTLNN SIPFKLSSYT DDKILISYFN
     KFFKRIKSSS VLNMRYKNDK YVDTSGYDSN ININGDVYKY PTNKNQFGIY NDKLSEVNIS
     QNDYIIYDNK YKNFSISFWV RIPNYDNKIV NVNNEYTIIN CMRDNNSGWK VSLNHNEIIW
     TFEDNRGINQ KLAFNYGNAN GISDYINKWI FVTITNDRLG DSKLYINGNL IDQKSILNLG
     NIHVSDNILF KIVNCSYTRY IGIRYFNIFD KELDETEIQT LYSNEPNTNI LKDFWGNYLL
     YDKEYYLLNV LKPNNFIDRR KDSTLSINNI RSTILLANRL YSGIKVKIQR VNNSSTNDNL
     VRKNDQVYIN FVASKTHLFP LYADTATTNK EKTIKISSSG NRFNQVVVMN SVGNCTMNFK
     NNNGNNIGLL GFKADTVVAS TWYYTHMRDH TNSNGCFWNF ISEEHGWQEK
//
```